

## SEQLIST

## SEQUENCE LISTING

&lt;110&gt; Fronticelli, Clara

&lt;120&gt; Polymeric Hemoglobin Mutants

&lt;130&gt; 6056-279 PC

&lt;140&gt; PCT/US99/22756

&lt;141&gt; 2000-05-01

&lt;150&gt; 60/102,640

&lt;151&gt; 1998-10-01

&lt;160&gt; 12

&lt;170&gt; FastSEQ for Windows Version 4.0

&lt;210&gt; 1

&lt;211&gt; 438

&lt;212&gt; DNA

&lt;213&gt; Human

&lt;400&gt; 1

```
gtgcacctga ctctgagga gaagtctgcc gttactgcc tgtggggcaa ggtgaacgtg 60
gatgaagttg gtggtgaggc cctgggcagg ctgctggtgg tctacccttg gaccagagg 120
ttctttgagt cctttgggga tctgtccact cctgatgctg ttatgggcaa ccctaagggtg 180
aaggctcatg gcaagaaagt gctcgggtgcc tttagtgatg gcctggetca cctggacaac 240
ctcaagggca cctttggcac actgagttag ctgcaactgtg acaagctgca cgtggatcct 300
gagaacttca ggctcctggg caacgtgctg gtctgtgtgc tggcccatca ctttggcaaa 360
gaattcacc caccagtgcg ggctgcctat cagaaagtgg tggctggtgt ggctaatagcc 420
ctggcccaca agtatcac                                     438
```

&lt;210&gt; 2

&lt;211&gt; 438

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Mutant Of  
Human Beta-globin

&lt;400&gt; 2

```
gtgcacctga ctctgagga gaagtgcgcc gttactgcc tgtggggcaa ggtgaacgtg 60
gatgaagttg gtggtgaggc cctgggcagg ctgctggtgg tctacccttg gaccagagg 120
```

## SEQLIST

```

ttcttttgagt cctttgggga tctgtccact cctgatgctg ttatgggcaa ccctaagggtg 180
aagggtcatg gcaagaaagt gctcgggtgcc tttagtgatg gcctgggetca cctggacaac 240
ctcaaggggca cctttggcac actgagtgag ctgcatgctg acaagctgca cgtggatcct 300
gagaacttca ggctcctggg caacgtgctg gtcgggtgtgc tggcccatca ctttggcaaa 360
gaattcacc caccagtgc ggcctgcctat cagaaagtgg tggctggtgt ggctaatagcc 420
ctggcccaca agtatcac                                     438

```

<210> 3  
 <211> 146  
 <212> PRT  
 <213> Human

<400> 3  
 Val His Leu Thr Pro Glu Glu Lys Ser Ala Val Thr Ala Leu Trp Gly  
 1 5 10 15  
 Lys Val Asn Val Asp Glu Val Gly Gly Glu Ala Leu Gly Arg Leu Leu  
 20 25 30  
 Val Val Tyr Pro Trp Thr Gln Arg Phe Phe Glu Ser Phe Gly Asp Leu  
 35 40 45  
 Ser Thr Pro Asp Ala Val Met Gly Asn Pro Lys Val Lys Ala His Gly  
 50 55 60  
 Lys Lys Val Leu Gly Ala Phe Ser Asp Gly Leu Ala His Leu Asp Asn  
 65 70 75 80  
 Leu Lys Gly Thr Phe Ala Thr Leu Ser Glu Leu His Cys Asp Lys Leu  
 85 90 95  
 His Val Asp Pro Glu Asn Phe Arg Leu Leu Gly Asn Val Leu Val Cys  
 100 105 110  
 Val Leu Ala His His Phe Gly Lys Glu Phe Thr Pro Pro Val Gln Ala  
 115 120 125  
 Ala Tyr Gln Lys Val Val Ala Gly Val Ala Asn Ala Leu Ala His Lys  
 130 135 140  
 Tyr His  
 145

<210> 4  
 <211> 146  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Mutant of  
 Human beta-globin

<400> 4  
 Val His Leu Thr Pro Glu Glu Lys Cys Ala Val Thr Ala Leu Trp Gly  
 1 5 10 15  
 Lys Val Asn Val Asp Glu Val Gly Gly Glu Ala Leu Gly Arg Leu Leu

## SEQLIST

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     | 20  |     |     |     |     |     | 25  |     |     |     | 30  |     |     |
| Val | Val | Tyr | Pro | Trp | Thr | Gln | Arg | Phe | Phe | Glu | Ser | Phe | Gly | Asp | Leu |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ser | Thr | Pro | Asp | Ala | Val | Met | Gly | Asn | Pro | Lys | Val | Lys | Ala | His | Gly |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Lys | Lys | Val | Leu | Gly | Ala | Phe | Ser | Asp | Gly | Leu | Ala | His | Leu | Asp | Asn |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Leu | Lys | Gly | Thr | Phe | Ala | Thr | Leu | Ser | Glu | Leu | His | Ala | Asp | Lys | Leu |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     | 95  |     |     |
| His | Val | Asp | Pro | Glu | Asn | Phe | Arg | Leu | Leu | Gly | Asn | Val | Leu | Val | Gly |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Val | Leu | Ala | His | His | Phe | Gly | Lys | Glu | Phe | Thr | Pro | Pro | Val | Gln | Ala |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Ala | Tyr | Gln | Lys | Val | Val | Ala | Gly | Val | Ala | Asn | Ala | Leu | Ala | His | Lys |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Tyr | His |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 145 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

<210> 5  
 <211> 141  
 <212> PRT  
 <213> Human

|         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 5 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Val     | Leu | Ser | Pro | Ala | Asp | Lys | Thr | Asn | Val | Lys | Ala | Ala | Trp | Gly | Lys |
| 1       |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Val     | Gly | Ala | His | Ala | Gly | Glu | Tyr | Gly | Ala | Glu | Ala | Leu | Glu | Arg | Met |
|         |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Phe     | Leu | Ser | Phe | Pro | Thr | Thr | Lys | Thr | Tyr | Phe | Pro | His | Phe | Asp | Leu |
|         |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ser     | His | Gly | Ser | Ala | Gln | Val | Lys | Gly | His | Gly | Lys | Lys | Val | Ala | Asp |
|         | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ala     | Leu | Thr | Asn | Ala | Val | Ala | His | Val | Asp | Asp | Met | Pro | Asn | Ala | Leu |
| 65      |     |     |     |     | 70  |     |     |     | 75  |     |     |     |     | 80  |     |
| Ser     | Ala | Leu | Ser | Asp | Leu | His | Ala | His | Lys | Leu | Arg | Val | Asp | Pro | Val |
|         |     |     | 85  |     |     |     |     |     | 90  |     |     |     | 95  |     |     |
| Asn     | Phe | Lys | Leu | Leu | Ser | His | Cys | Leu | Leu | Val | Thr | Leu | Ala | Ala | His |
|         |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Leu     | Pro | Ala | Glu | Phe | Thr | Pro | Ala | Val | His | Ala | Ser | Leu | Asp | Lys | Phe |
|         |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Leu     | Ala | Ser | Val | Ser | Thr | Val | Leu | Thr | Ser | Lys | Tyr | Arg |     |     |     |
|         | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |

<210> 6  
 <211> 141  
 <212> PRT

## SEQLIST

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Mutant Of  
Human Alpha-globin

&lt;400&gt; 6

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Leu | Ser | Pro | Ala | Asp | Lys | Thr | Asn | Val | Lys | Ala | Ala | Trp | Gly | Lys |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     |     | 15  |     |
| Val | Gly | Ala | His | Ala | Gly | Glu | Tyr | Gly | Ala | Glu | Ala | Leu | Glu | Arg | Met |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Phe | Leu | Ser | Phe | Pro | Thr | Thr | Lys | Thr | Tyr | Phe | Pro | His | Phe | Asp | Leu |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Ser | His | Gly | Ser | Ala | Gln | Val | Lys | Gly | His | Gly | Lys | Lys | Val | Ala | Asp |
|     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ala | Leu | Thr | Asn | Ala | Val | Ala | His | Val | Asp | Asp | Met | Pro | Asn | Ala | Leu |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Ser | Ala | Leu | Ser | Asp | Leu | His | Ala | His | Lys | Leu | Arg | Val | Asp | Pro | Val |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Asn | Phe | Lys | Leu | Leu | Ser | His | Ser | Leu | Leu | Val | Thr | Leu | Ala | Ala | His |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Leu | Pro | Ala | Glu | Phe | Thr | Pro | Ala | Val | His | Ala | Ser | Leu | Asp | Lys | Phe |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Leu | Ala | Ser | Val | Ser | Thr | Val | Leu | Thr | Ser | Lys | Tyr | Arg |     |     |     |
|     |     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |

&lt;210&gt; 7

&lt;211&gt; 423

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Mutant of  
Human alpha-globin

&lt;400&gt; 7

|            |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|-----|
| gtgctgtctc | ctgccgacaa | gaccaacgtc | aaggccgcct | ggggcaaggt | tggcgcgcac | 60  |
| gctggcgagt | atggtgcgga | ggccctggag | aggatgttcc | tgtccttccc | caccaccaag | 120 |
| acctacttcc | cgcacttcga | cctgagccac | ggctctgccc | aggttaaggg | ccacggcaag | 180 |
| aaggtggccg | acgcgctgac | caacgccgtg | gcgcacgtgg | acgacatgcc | caacgcgctg | 240 |
| tccgccctga | gegacctgca | cgcgcacaag | cttcgggtgg | acccggtcaa | cttcaagctc | 300 |
| ctaagccact | ccctgctggt | gaccctggcc | gccacacctc | ccgccgagtt | caccctgcg  | 360 |
| gtgcacgcct | ccctggacaa | gttcctggct | tctgtgagca | ccgtgctgac | ctccaaatac | 420 |
| cgt        |            |            |            |            |            | 423 |

&lt;210&gt; 8

&lt;211&gt; 4

## SEQLIST

<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Factor Xa  
recognition sequence

<400> 8  
Ile Glu Gly Arg  
1

<210> 9  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Mutagenizing  
oligonucleotide for human beta-globin Ser9-Cys  
mutation

<400> 9  
ggcagtaacg gcgcacttct cctcagg

27

<210> 10  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Mutagenizing  
oligonucleotide for human beta-globin Cys93-Ala  
mutation

<400> 10  
tgcagcttgt cagcatgcag ctccactc

27

<210> 11  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Mutagenizing  
oligonucleotide for human beta-globin Cys112-Gly  
mutation

## SEQLIST

&lt;400&gt; 11

cagcacaccg accagcac

18

&lt;210&gt; 12

&lt;211&gt; 423

&lt;212&gt; DNA

&lt;213&gt; Human

&lt;400&gt; 12

|            |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|-----|
| gtgctgtctc | ctgccgacaa | gaccaacgtc | aaggccgcct | ggggcaaggt | tggcgcgcac | 60  |
| gctggcgagt | atggtgcgga | ggccctggag | aggatgttcc | tgtccttccc | caccaccaag | 120 |
| acctacttcc | cgcacttcga | cctgagccac | ggctctgccc | aggttaaggg | ccacggcaag | 180 |
| aaggtggccg | acgcgctgac | caacgcogtg | gcgcacgtgg | acgacatgcc | caacgcgctg | 240 |
| tccgccctga | gcgacctgca | cgcgcacaag | cttcgggtgg | acccggtcaa | cttcaagctc | 300 |
| ctaagccact | gcctgctggt | gaccctggcc | gccacctcc  | cgcgcgagtt | caccctgcg  | 360 |
| gtgcacgcct | ccctggacaa | gttcctggct | tctgtgagca | cogtgctgac | ctccaaatac | 420 |
| cgt        |            |            |            |            |            | 423 |